

# Chetan Reddy N

✉ [chetanreddyn22@gmail.com](mailto:chetanreddyn22@gmail.com) | 🌐 [chetanreddy1412](https://github.com/chetanreddy1412) | in [LinkedIn](#) | 🌐 [chetanreddy1412.github.io](https://github.com/chetanreddy1412.github.io)

## EDUCATION

### Stanford University, California, USA

MS in Mechanical Engineering (Robotics)

Sept 2024 - Present

### Indian Institute of Technology Madras, India

Bachelors (B.Tech) in Mechanical Engg, Masters (M.Tech) in Data Science | CGPA: 9.48/10 | Rank: 3/41

Aug 2019 - May 2024

### KTH Royal Institute of Technology, Sweden

Semester Exchange | School of Electrical Engineering and Computer Science | GPA: 5.0/5.0

Aug 2022 - Jan 2023

## SCHOLASTIC ACHIEVEMENTS

- Awarded \$7,200 for successfully filing a patent at the USPTO from our work at Adobe Research. 2024
- Secured 3rd place among 70 researchers for the Best Thesis Poster in Data Science receiving a prize of Rs.25000 2024
- Recipient of the ¥160,000 JASSO Scholarship awarded by the Government of Japan. 2022
- Secured an All India Rank 957 in JEE (Mains) 2019 out of 1 million candidates across the country. 2019
- Secured an All India Rank 931 in JEE (Advanced) 2019 out of 150,000 shortlisted candidates. 2019
- Achieved a State Rank of 15 in Karnataka Common Entrance Test 2019 written by about 200,000 students. 2019

## RESEARCH EXPERIENCE

### Human in the Loop, Safe and Verifiable Reinforcement Learning (RL) | IIT Madras 🔗

Dual Degree Thesis | Guides: Prof. Nirav Bhatt and Prof. Balaraman Ravindran

Chennai, India

Aug 2023 - Jun 2024

- Developed a framework to formulate Safe RL problems with human guidance, to enable safer training.
- Modified the DDPG algorithm to enable action masking in continuous spaces by leveraging a human-provided safe set.
- Achieved close to 100% safety in both training and deployment while maximising rewards.

### Safety Critical Navigation using Depth Information | KTH Royal Institute of Technology 🔗

Graduate Research Collaborator | Guide: Prof. Jana Tumova

Stockholm, Sweden

Jan 2023 - May 2023

- Developed control strategies to achieve obstacle avoidance with provable safety guarantees in an unknown and stochastic environment by using control barrier functions (CBFs).
- Defined new notions of safesets that can be obtained from the noisy depth images to construct the CBFs.
- Implemented a fully functioning pipeline in ROS with a turtlebot equipped with an Intel RealSense RGB-D camera.

### Use of Deep Reinforcement Learning in Autonomous Cars | Hokkaido University 🔗

Research Intern | Guide: Prof. Hidenori Kawamura

Sapporo, Japan

May 2022 - Jul 2022

- Investigated the use of RL to optimise traffic flow in scenarios like highway merge and intersection crossings.
- Implemented the Dueling Double DQN Algorithm and tested it with different state space encodings to represent the traffic.
- RL-based autonomous cars reduced the average congestion clearance time by 30% relative to rule-based agents.

## WORK EXPERIENCE

### Targetable Causal AI: Clustering Users according to Causal Relationships | Adobe Research 🔗

Summer Research Intern | Guide: Dr. Atanu R Sinha | \*Patent Application submitted to USPTO

Bengaluru, India

May 2023 - Aug 2023

- Examined the role of unobserved heterogeneity in estimating causal effects of actions to improve targeting decisions.
- Researched and implemented different algorithms for causal inference like PC, FGES, FCI and LINGAM.
- Achieved robust market clustering by developing a novel algorithm combining DL with causal structure discovery.
- Identified and analyzed metrics for evaluating the causal models implemented on real and observational data.

### Clickbait Analysis of News Sites | Digital Outcomes 🔗

Machine Learning Intern | Guide: Pranav Shah

Mumbai, India

May 2021 - Jun 2021

- Worked on applying advanced ML techniques to identify whether a news headline is clickbait or not.
- Developed a web scraping tool to gather data from news websites and collected around 100,000 data points.
- Built SVM and decision tree models with TF-IDF embedding and achieved an F1 score of 0.91 and 0.88.
- Achieved a higher F1 score of 0.94 using a transfer learning model with BERT implemented in TensorFlow.

- **Robotics:** Introduction to Robotics\* | Safe Robot Planning and Control\* | Control Systems | Automation in Manufacturing
- **AI/ML:** Reinforcement Learning | Pattern Recognition and Machine Learning | Data Analytics Lab | Big Data Lab
- **Mathematics:** Multivariable Calculus | Probability, Statistics and Stochastic Processes | Linear Algebra | Differential Equations
- **Computer Science:** Data Structures and Algorithms using Python | Design and Analysis of Algorithms

## SKILLS

- **Programming Languages:** C, C++, Python (NumPy, Pandas, PyTorch, TensorFlow, OpenCV, Matplotlib, Seaborn, Rospy)
- **Tools:** Robot Operating System (ROS), MATLAB, Fusion 360, Git,  $\LaTeX$ , Linux, Google Cloud Platform (GCP)

## KEY PROJECTS

### Drone Swarm Challenge | Inter IIT Tech Meet 2023 - IIT Kanpur

Dec 2022 - Feb 2023

Developed a vision-based centralised controller to communicate with and control drones to move in a coordinated manner.

- Achieved stable hovering and vision-guided rectangular motion of drones by implementing a **multi-axis PID controller**.
- Developed a **Telnet interface for swarm communication** and a PID class for simultaneous control of multiple UAVs.
- Transformed the existing ROS-based communication framework into a python script making it **platform-independent**.
- Designed a post-flight analytics dashboard to assess and tune the algorithm using React.js and Plotly.

### Competitive Multi-Agent Reinforcement Learning | RL Games Hackathon | Shaastra 2022

Dec 2021 - Jan 2022

Created bots using reinforcement learning to compete with other bots in a virtual two-player 2D game setting.

- **Winner of the competition** with over **700 participants across India** and earned a cash prize of Rs.10,000.
- Implemented two deep reinforcement learning models in **Pytorch** namely Policy Gradients and Deep Q Learning.
- Crafted a **novel feature engineering technique** inspired by the decision tree algorithm, doubling the average score earned.

### Mission Planner for Autonomous Robots | Course Project - Introduction to Robotics

Aug 2022 - Dec 2022

Course Project for the introductory course to the Masters in Robotics Program at KTH Royal Institute of Technology, Sweden

- Implemented **Inverse Kinematics solution** for a 7 DOF robotic arm using its Denavit-Hartenberg parameterization.
- Coded **A\* and Rapidly Exploring Random Tree (RRT)** algorithms from scratch for navigation.
- Achieved autonomous navigation and manipulation based on high level instructions by building a **mission planner for the TIAGo robot in ROS using behaviour trees**.

### Wells Fargo Quantitative AI Hackathon | Shaastra 2022

Dec 2021 - Jan 2022

Forecasted the implied volatility surface of options over 60 trading days using 2.5 years of past volatility surface data.

- Secured **3rd place out of 500+ teams** registered across the country in the national-level quantitative AI hackathon.
- Attained an RMS error of 0.033 based on a univariate approach using ARIMA (Autoregressive Integrated Moving Average).
- Further implemented an **autoencoder decoder LSTM network** which decreased the RMS error by 15%.

### Extra-Terrestrial Manufacturing | Course Project - Automation in Manufacturing


Feb 2022 - May 2022

Conducted a study on the production of oxygen using lunar regolith and the feasibility of setting up a factory on the moon.

- Designed the required space factory components in **Fusion 360**, addressing material handling systems and energy requirements for low-gravity operations.
- Analyzed the **manufacturing metrics and the economic viability** of setting up such a facility for future moon missions.

## SOCIAL IMPACT

### Coordinator of UpSkill | Shaastra 2021

- Worked in a team of 8 to promote computational thinking in schools impacting over **7000 school teachers** across India.
- **Moderated a virtual Panel Discussion** on Computational thinking with panellists from Google, Microsoft and ACM. 
- Solely responsible for striking a deal with Codingal, an ed-tech startup that served as the curriculum partner of UpSkill.

## TEACHING AND EXTRACURRICULAR ACTIVITIES

- Conducted lab sessions as the **Teaching Assistant** for courses - **Machine Design Lab and Automation in Manufacturing**.
- Served as a **mentor to six freshmen** at IIT Madras, facilitating their academic and co-curricular adaptation.
- Helped plan and organise large-scale games and ice breakers for the crowd at Saarang 2020, attended by 70,000+.
- **Sports**
  - **Athletics:** Awarded a 100m silver medal in a state level competition by Anju Bobby George (ex-Indian Olympic athlete).
  - **Field Hockey:** Played as a right forward on the gold medal winning team in the Intra IIT Madras Hockey Tournament 2022.